



V.—*A Review of Canadian Botany from the First Settlement of New France to the Nineteenth Century. Part I.* By D. P. PENHALLOW.

(Read May 26, 1887.)

So far as we are aware, no attempt has yet been made to bring together in connected form, the more important facts relating to the development of botanical science in Canada. To the active botanist, the desirability of such a work being undertaken and executed, is frequently apparent, more especially as our general knowledge of the earlier botanists is far too meagre and scattered. The present paper has been prepared, therefore, with a view to meeting this want. As the first two hundred and sixty odd years in the history of this country constituted a period of very slow scientific progress, and as with the commencement of the present century, an era of great activity was opened, the year 1800 offers a natural and fitting division in the consideration of our subject. The present paper deals with the progress made up to that year, though certain publications are noted, even when their date is a few years later, because they are the last works of men who properly belonged to, and who really accomplished their labors in the period preceding the date stated. Thus, Michaux's "*Flora Boreali-Americana*," published in 1803, is properly included here. As André Michaux and Menzies closed the history of the first period, so did F. A. Michaux and Pursh begin the second period—a period rich in discovery, and remarkable for botanical progress, and which will be dealt with separately in a subsequent paper.

In the list of explorers, missionaries and naturalists, appended to this paper, an effort has been made to give correct biographical data. This has not been altogether possible in a few instances, but, from numerous verifications, we believe the data, so far as given, to be correct. In the list of writings appended to each name, we have included all such as have a direct or indirect reference to the Canadian flora. And, although not entitled to any claims as botanists, we have thought it best to include the works of Jefferys, Denis, Weld, Hearne and one or two others, as they pretend to give an account of the natural history of the country. This, however, at least so far as the botany is concerned, is often dealt with very briefly, and in a most unsatisfactory manner.

In the preparation of this paper, we are greatly indebted to Mr. Gerald E. Hart, for access to his very valuable library of works on the early history of Canada. We would also express our obligations to Messrs. R. W. Boodle, J. Reade and S. E. Dawson, for valuable suggestions; likewise to Prof. Sereno Watson, of Cambridge, Mass., to Mr. D. Morris, of Kew, and to Rev. E. I. Rexford and Mr. St. Cyr, of Quebec, for valuable assistance in verifying data. Among the works of reference to which we have had access, special mention should be made of several valuable manuscripts on Canadian history by Bibaud "*le jeune*," kindly placed at our disposal by the Librarian of the Fraser Institute.

One of the first and most striking facts the student encounters, is the very great paucity of botanical works, prior to the present century, which can be regarded as in any sense Canadian. During a period of two hundred and sixty-five years, the total number

of those who were in any way connected with botanical work in Canada, probably did not exceed twenty-four¹—an average of about ten for each century. Nor did all these contribute direct botanical work or writings. This is explained, however, when we recall the state of botanical science in Europe for the same period, and realise that the impulse to exploration came from the hope of extending domain. The idea of exploration for scientific purposes, even as subordinate to other objects, did not develop until about the middle of the eighteenth century—Kalm being the first to visit these shores in behalf of science.

Of the twenty-four whom we may thus claim as our early botanists, 12.5 per cent. were missionaries; 33.3 per cent. were explorers with whom the natural history of the country was only incidental—many explorers taking no notice of it at all;—while, if we may be permitted to include certain state officials who were only indirectly interested, the remaining 54.2 per cent. were naturalists.

Again, of all these, 79.1 per cent. treated of the botany of Canada directly. The remaining 20.9 per cent. dealt with our flora only incidentally, e. g., Tournefort and L'Heretier, who described certain collections; Bartram, in his account of the North American species of the vine; and to the same category belong Linnaeus, Forster and Richard. Of those who dealt with the Canadian flora directly, were Sarrasin, Newenham. (?) Menzies, Lafitau, Kalm, Hennepin, Gaultier, Diéreville, Cornut, Charlevoix, Thèvet, Michaux, Champlain, Boucher, Hearne, Weld, Denis and Jefferys. Another noteworthy fact is, that none of these men were native born. Sarrasin married and died in Canada. Boucher and Champlain also died here. Others, as Cornut, Richard, Tournefort and L'Heretier, did not even visit the country, but accomplished their work through the medium of collections made by others. And if we inquire into their nationality, we find there were—French, fourteen; English, five; Americans, two; Swedes, two; Germans, one. While, therefore, the early Canadian botany was wholly dependent for its development upon aliens, the French had by far the greater number of workers in the field. This was the necessary result of (1) the fact that the centres of higher education were all in Europe, and such institutions as possessed any facilities for botanical instruction on this continent were not in a position to properly qualify men in this direction, until a comparatively late period; (2) the occupation of Canada as French territory. We may note, however, that the beginning of botanical work here, was practically simultaneous with the origin of the science in Europe, and in all its later phases of development, Canadian botany has followed and been dependent upon the advances made in the Old World and also in the United States. It is only within a comparatively short time that we have been able to produce independent work.

Finally, it must be kept in mind that the titles given to the writings of many of the early travellers, are often sadly misleading as to the actual contents of the volume; and while an elaborate title conveys the impression that a rich store of information may be found within, nothing but disappointment is often met with. When the natural history is treated of, it is often with sole reference to animals and fish, while in other cases plants are dealt with but briefly. This finds its illustration, among other works, in Jefferys'

¹ It is quite probable that this does not represent the full number of the early Canadian botanists. The lapse of so long a period without any definite record of their names and work, has sufficed to relegate to obscurity all except those whose published works have survived to the present time.

"Natural and Civil History of the French Dominions in North America." Also in Denis's "Description Géographique et Historique des Côtes de l'Amérique-Septentrionale, avec l'Histoire Naturelle de ce Pays." In Diéreville's "Relation du Voyage du Port-Royal de l'Acadie," which is half prose and half verse, there appears to be nothing of special value relating to the vegetation of the country. Nor are we at liberty to infer that the appearance of "North America" on the title page indicates that Canada is referred to in the text. As a matter of fact, it frequently occurs that when such title is used, only a portion of this continent is dealt with, and that Canada is not referred to at all.

Our review properly begins with the first voyage of Jacques Cartier to New France, in 1534. The shores he visited were then clad with a vegetation as yet unmodified by the agency of man. Everywhere a rich growth of virgin forest spread over hill and valley, and lent its potent influence to give these early explorers abundant assurance of the wealth of natural resource which the country contained. Within the three hundred and fifty years that have since passed, however, changes of an important character have taken place to a striking degree; and an explorer now, visiting our shores for the first time, would be obliged to base his estimate of natural resources upon somewhat different evidence than that used by Cartier. Nor are those changes completed. They are going on at the present day at accelerating rates, and cause us to scan the future, into which they must extend with results we cannot foresee, with a measure of justifiable solicitude. The modification of our flora through the introduction of new species from abroad; the practical destruction of species in certain localities, and their extension to new areas of distribution; the denudation of large areas formerly heavily clothed with valuable timber, and, together with these, the various attendant changes affecting man's comfort and welfare—these are all changes still in progress, which not only present many problems of the highest botanical interest, but in their relation to our future welfare, they are also changes which may well cause the prudent economist and statesman to pause and consider.

Jacques Cartier, like most of his immediate successors in the discoveries of the New World, appears to have been a far better navigator than naturalist, if we are to judge by his journals,¹ which are most barren of botanical information. Nor is this at all a matter of surprise when we consider the development of the natural sciences in his time. It was, therefore, to be expected, that his immediate followers should also deal only with very general observations.

Champlain² appears to have been imbued with a broad spirit of enterprise, both as an explorer and naturalist, since his journals bear evidence of serious attempts to do justice to the natural history of the country explored. He landed at Quebec on July 3rd, 1608, and, on October 24th, he records having planted grape-vines brought from Europe. His journals are somewhat profusely illustrated with animals and plants, but his skill as a delineator was, unfortunately, not of a very high order. Some of his plants are recognisable, others are not; and, as there were no attempts at classification, his use of local names, or of common names derived from France, renders their identification a matter of some doubt. Such notes as he made of the vegetation of the districts through which he passed,

¹ Voyages de Jacques Cartier, 1864.

² Les Voyages du Sieur de Champlain, 1613. Œuvres de Champlain, Quebec, 1870.

are of a most general character, and almost wholly relate to those forms which would naturally attract his attention, because of their direct relation to subsistence, or their application to house and ship building. Nevertheless, it would appear that collections of plants must have been made about this time, either by members of the expedition or by those who shortly followed it, since Cornut's "*Canadensium Plantarum Historia*," the first work on Canadian botany, was published in 1635.

La Salle, in his voyage down the Mississippi in the years 1679 to 1682, possessed unrivalled opportunities for observation on the flora of that vast region, but his interest was too fully concentrated upon the primary object of his expedition, and the only notes of information which he has left, are such as were gathered and preserved by his attendants. Similarly, La Hontan's journey, in 1703,¹ has left us nothing of value in this direction.

In the year 1706, Diéreville² visited the coast of America, an account of which he has left in his "*Voyage du Port-Royal de l'Acadie*," published at Amsterdam in 1708. He carried a number of plants back to France, and submitted them to Tournefort, one of the three great botanists of that day. Among other plants, was a specimen of the bush honeysuckle, a plant entirely new to Tournefort, who dedicated it to its discoverer under the generic name of *Diervilla*.

Following Diéreville by nearly half a century was Mark Catesby, a naturalist explorer, who left an important contribution to our knowledge of the North American flora in his "*Hortus Britannico-Americanus, or the Trees and Shrubs of North America*," published at London, in 1763. Yet this work can not be regarded as properly bearing upon the Canadian flora, since the eighty-five species which it describes, are dealt with as belonging to the Southern States. A few of the species, viz., oak, maple, dogwood, etc., are also Canadian, but that they were so was not within his knowledge.

Mackenzie,³ in 1789, penetrated the heart of British North America to the mouth of the river bearing his name. He also reached the Pacific Coast in the vicinity of Vancouver. Yet beyond a few casual observations upon the common trees met with, nothing was recorded. There were no attempts at scientific observations upon the flora of the country, which might have been expected to be one of the leading features of such an expedition. But this is accounted for, to a large extent, by the fact that there was no professional naturalist attached. Mackenzie himself, who appears to have had some appreciation of the desirability of such work, could not attend to its details, for, as he says in excuse, "I do not possess the science of the naturalist, and even if the qualifications of that character had been attained by me, its curious spirit could not have been gratified. I could not stop to dig into the earth, over whose surface I was compelled to pass with rapid steps; nor could I turn aside to collect the plants which Nature might have scattered in my way, when my thoughts were anxiously employed in making provision for the day that was passing over me." Moreover, as he recorded later, the numerous perils of the voyage and a turbulent crew of men, fully engaged his attention, had it been otherwise possible to

¹ Voyage de la Baron de La Hontan dans l'Amérique Septentrionale, 1703.

² The available information respecting this early explorer is most fragmentary and unsatisfactory. A careful search through several large libraries, has failed to discover anything concerning him beyond the very scanty information usually found in biographical dictionaries, and which is stated in the accompanying list.

³ Mackenzie's Voyages, etc., 1801.

prosecute such investigations. As it was, his efforts were concentrated upon finding new avenues for trade, and, if possible, solving the question of a north-west passage to India.

In his voyage to the Pacific from 1790 to 1795, Vancouver¹ visited the west coast of America. His was the first expedition to visit Canada, having a professional naturalist attached to it, and it was at that time that Mr. Archibald Menzies, a surgeon in the Royal Navy, accomplished that work which has since made his name a familiar one in Canadian botany.

That, for two hundred and sixty-five years, the explorers of this great country contributed but little to the advancement of our botanical knowledge, stands as a conspicuous fact; though among them all, there occasionally appeared one who seemed in a measure to redeem the reputation of the class. It will be possible, however, to more fully appreciate the true position of these early explorers, and understand the general absence of botanical observations from their results, if we briefly recall the state of botanical science in Europe from the sixteenth to the close of the eighteenth century.

At the time of Cartier's voyages, botany as a science was unknown. Plants were regarded as of value only so far as they were directly applicable to economic purposes and to medical practice. No attempt had then been made to study plants scientifically and reduce them to a system of classification, nor was it until several years later, that Konrad Gesner, of Zurich, recognised the value of a classification based upon the embryo; although the application of the principle was not made until a yet later period, when Andrea Cespinalpi, an Italian, put it to a practical, though not wholly successful, test. The date of Champlain's voyage arrived, therefore, with botanical science in an unformed state. In the latter part of the seventeenth century, however, the two great lights in the botanical world, Ray in England and Tournefort in France, succeeded in establishing independent systems of classification, which, while they have long since been replaced, are yet justly regarded as constituting the first real basis of scientific botany. But it yet remained for the brilliant genius of Linnaeus to establish that system of binomial classification, which not only rendered him the father of botany, but which has been in use until a very recent period. The year 1737, in which the artificial system of Linnaeus was announced, may well be considered that from which botanical science dates its growth. Nor should we lose sight of the fact that, before Linnaeus, and even for some time after, there was no very general diffusion of botanical knowledge. Such as was acquired, was confined to a few specialists, to the medical profession, and to the priesthood, whose members, from their studious habits of life, would be among the first to acquire such information as was extant.

Following Linnaeus, or contemporary with him in the eighteenth century, there were several whose names are illustrious in the history of botanical progress, and whose labors gave a special impulse to the new science. The discovery of new lands, and the exploration of hitherto unknown regions, were continual sources of new and valuable material, upon the examination of which, there were abundant opportunities to found a reputation. Thus, within the eighteenth century, the names of Bernard de Jussieu, the contemporary of Linnaeus; of Adanson, his pupil; of A. L. Jussieu, his nephew, and at the close of the century, of De Candolle, appear as bright lights in a brilliant period of botanical progress.

¹ Vancouver's Voyages, 1801.

It is, therefore, in no respect strange that the earlier explorers like Cartier, Maisonneuve, Champlain, La Salle and others, should have failed to attach any very great degree of importance to botanical research; though one cannot help the feeling that the special activity in this direction, which was manifest in the time of Mackenzie and other explorers of that period, should have led them to attach more importance to the labors of the naturalist than appears to have been the case. But it is to entirely different hands that we must look for any very tangible results; and these are the priests, the resident physicians and other colonial officers, and a few eager naturalists who were despatched on special missions, to gain glory for themselves, but most generally at great pecuniary sacrifice, and often, also, at the permanent expense of their health.

For our earliest knowledge of Canadian botany, we are first of all indebted to that noble class of self-sacrificing men, the early French missionaries, who preceded or accompanied the various explorers in their expeditions, and to whom we owe much for some of the most important results achieved during those times of great difficulty and personal sacrifice.

One of the earliest priests to leave any special notes upon the vegetation of Canada, was the Franciscan, Hennepin, who sailed from France in company with François de Laval, afterwards Bishop of Quebec, and who accompanied La Salle in his famous voyages during the period from 1679 to 1682.¹ To his care and foresight we largely owe the preservation of the records of that ill-fated expedition. Hennepin explored the country through the entire region of the St. Lawrence and the great lakes; westward into Wisconsin, where he was carried as a captive, and southward to New Orleans. Of the vegetation, he has comparatively little to say, beyond noting the occurrence of well-known trees. He certainly appears to have made no collections, nor did he give any written account of special questions touching the botany of the districts he visited. He refers, on several occasions, to the great density of the forests, which rendered travel by any other vehicle than the canoe, impracticable. He also speaks on more than one occasion, of the great abundance of grape vines, which were everywhere designated by the French as "*Vignes de Battures*"; and to the prevalence of walnut, chestnut and plum trees about Lake Erie. He makes mention of one fact which possesses a somewhat peculiar interest, viz., that he frequently made blazes on trees, as was then customary, in order to mark the trail. These he refers to as made in the form of a cross.

In the Peter Redpath Museum of McGill University, there is a specimen of a blaze upon a beech tree, which may have been made for the purpose above indicated.² The figure was made with a knife, and is in the form of a crowned arch enclosing the initials *J. C.*, *M. J.* and *F.*, with a heart surmounted by a cross. According to the testimony of Sisters of the Ville Marie Convent, this indicates, as would naturally be inferred, the work of a Franciscan monk. The tree upon which the blaze was made, appears to have been about four and one-half inches in diameter, while in the wood which subsequently formed external to the blaze, at least 160 rings of annual growth have been counted. Two impressions are to be observed—one representing the original blaze, and the other a cast from it, made by the overgrowing wood, both being very clearly defined. The

¹ Fr. Hennepin's *Discovery in America*, with La Salle's *Voyages*, etc., 1689.

² *Science*, iii, 354.

figure was clearly cut with a knife, as shown by the well-preserved incised lines; though the outer cast, being in black, at first leads one to suppose a hot iron to have been employed. Upon closer examination, however, it appears that the black or carbonised portions were the result of partial decay, the decayed portions being subsequently covered, and thus producing the appearance observed. The specimen was found at Belle Rivière, in the parish of Two Mountains, and was only discovered by accident, when cutting up fire-wood. It was rescued and presented to the museum by Mr. William Oswald, Jun. Mr. John Rende has recently drawn my attention to the fact that Abbé Tanguay¹ gives the year 1721 as the date when this parish was established. This would exactly coincide with the probable time that has elapsed since the blaze was cut, and suggests the possibility of its having been one of several other boundary blazes. If this be the case, it is not improbable that others may be found on the line of the old parish boundary.

The next missionary of note who claims our attention, was the Jesuit, Charlevoix,² who reached Quebec on September 23rd, 1720. Travelling by way of the St. Lawrence and the great lakes, he descended the Mississippi and visited St. Domingo, whence he returned to France, without again visiting Canada.

Although like so many of his predecessors, Charlevoix appeared to devote his attention chiefly to the Indians, his journals contain notes on the botany of the country, which are not without interest. Speaking of the grandeur of the forests, and size of the trees, which seem to have made a great impression upon him, he says, "Nothing can present a nobler or more magnificent prospect to the eyes; the trees hide their tops in the clouds, and the variety of different species of them is so prodigious, that even amongst all those who have most applied themselves to a knowledge of them, there is not perhaps one, who is not ignorant of at least one-half of them."³ He refers to the abundance of both red (*Juniperus Virginiana*, L.) and white cedar (*Thuja occidentalis*, L.). He also distinctly speaks of the general distribution all over Canada—probably intending to refer more particularly to Ontario and the West—of both white (*Quercus alba*, L.) and red (*Quercus rubra*, L.) oak. Of the walnuts he mentions three kinds, but from his description, he evidently includes the butternut and two of the hickories in this list. He recognised the hop, (*Humulus lupulus*, L.) though an old world species, as also clearly indigenous to this continent. He also makes the somewhat surprising statement that "The Indians were acquainted before our arrival in their country, with the common and water melon. The former are as good as those in France, especially in this island (Montreal) where they are in great plenty."⁴ There is an obvious error of observation here. De Candolle distinctly states what is commonly accepted by botanists—and in contradiction of which we have seen no good proof—when he says that the water melon was introduced into America by Europeans,⁵ and the same may also be said of the common melon.⁶ Yet, as we shall see again, later travellers in Canada appear to have been misled into giving currency to the same opinion.

Among other observations of interest, he mentions the milkweed (*Asclepias Cornuti*)

¹ Dictionnaire Généalogique, i. 601.

² Histoire et Description générale de la Nouvelle France, Paris, 1744. Journal of a Voyage to North America, London, 1760.

³ Voyage to North America, i. 245.

⁴ *Ibid.*, i. 250.

⁵ Origin of Cultivated Plants, p. 264.

⁶ *Ibid.*, p. 261.

called by the Indians "Cotton tree." Of this, he says, "In the morning, before the dew is off, stroke the flowers, and there falls from them a kind of honey, which, by boiling, is reduced to a kind of sugar."¹ He apparently refers to the nectar of the flowers, which, diluted by dew, may then be collected, thus constituting a kind of manna. The sunflower is mentioned as cultivated by the Indians for the seed, from which they prepared an oil for anointing the hair. Jefferys mentions the same use of the sunflower or Heliotrope.² Ginseng was found to be in common use among the Miami Indians, about the southern extremity of Lake Michigan, and the same Indians were also in the habit of making cloth from the fibrous bark of the whitewood (*Tilia Americana*), a practice which finds a parallel in the manufacture of cloth from the fibrous bark of the *Ulmus montana*, var. *laciniata*, by the Ainos of northern Japan and eastern Siberia.

The production of maple sugar appears to have been a process which aroused more than usual interest in the minds of these early travellers. Charlevoix enters somewhat into detail concerning its mode of preparation and virtues. He says that "The Indians, who are perfectly well acquainted with all the virtues of their plants, have at all times, as well as at this day, made constant use of this liquor (the fresh sap). But it is certain, they were ignorant of the art of making sugar from it, which we have since taught them."³ Later writers also seem to have been impressed with this production of sugar, notably Weld,⁴ who makes somewhat detailed observations of interest. Thus he states that, "A pound of sugar is frequently produced from two or three gallons of the sap of the curled maple, whereas, no more than the same quantity can be had from six or seven gallons of that of the swamp. A maple tree, of the diameter of twenty inches, will commonly yield sufficient sap for making five pounds of sugar each year, and instances have been known of trees yielding nearly this quantity, annually, for a series of thirty years." Dr. Nooth of Quebec, is spoken of as having demonstrated the possibility of producing white sugar of the finest quality, with but little trouble.

Charlevoix finally ventures a remark which, with slight modification, might be made to apply to-day, that "It is surprising that in France, where there are so often met with persons who have spent a great part of their lives in Canada, they should have so imperfect a notion of the country."⁵ Among other useful labors performed by Charlevoix, in the interest of Canadian botany, was the translation of Cornut's work, to which he made several important additions.

Contemporary with Charlevoix, was the Jesuit Lafitau, resident at Caughnawaga. He does not appear to have given any marked attention to the flora of the country; nevertheless, to him we are indebted for the discovery of ginseng on the banks of the St. Lawrence in 1716.⁶ Through his efforts there arose an important commerce in the roots of this plant, as noted by Kalm at the time of his visit some thirty years later.

From this it would appear that, useful as they were in other directions, the early missionaries did not, in any very large degree, promote our knowledge of Canadian botany; nevertheless, in this, as in other fields of labor, they accomplished important work as pioneers, a position which should always command the respectful consideration of those

¹ Voyage to North America, i. 250.

² History of the French Dominion, p. 42.

³ Voyage to America, i. 192.

⁴ Travels in North America, i. 381.

⁵ Voyage to North America, i. 253.

⁶ La Plante du Ginseng du Tartarie decouverte en Canada, Paris, 1718. Canadian Naturalist, iii. 466.

who, in following, are to reap the benefit of hard-won victories and poorly-required toil. We are thus brought to consider the third class, that which includes the professional naturalist.

In 1635, Jacques Phillippe Cornut of Paris, published a list of Canadian plants, under the title of "*Canadensium Plantarum Aliarumque nondum editarum historia.*" This constituted the first publication relative to Canadian botany. It contains descriptions of a very considerable number of our common plants which are figured in admirably executed plates. We here, also, meet with generic names which are still retained in our modern classification, though ascribed to later botanists, such as Tournefort and Linnaeus, who must have derived them from Cornut without credit. Judged from our present standpoint of botanical knowledge, the descriptions are not wholly scientific, and the crude attempts at classification show no scientific basis. The work was translated a century later, by Charlevoix, who added many notes to it.

The earliest physician, whose name is prominently connected with the botany of this country, was Sarrasin, resident physician at the court of Quebec, in the early part of the eighteenth century, a position he held until his death, in 1734, at the age of seventy-five years. He was, therefore, at Quebec at the time of Charlevoix's visit; indeed, the latter specially refers to him on more than one occasion. Although he left no special writings on the Canadian flora, he sent collections of plants to Europe, and particularly to France. Among others, he sent the common pitcher plant, which he had discovered, and which Tournefort dedicated to him under the generic name of *Sarracenia*.

Sarrasin died just as Linnaeus was reaching fame. His collections, however, were probably among the first of those to reach Europe, and which served as the source whence Linnaeus first derived the material for his descriptions. Certain it is that, within the early and middle part of the eighteenth century, many plants were described by Linnaeus, in which the name of Canada is prominent. Thus the low blackberry, (*Rubus Canadensis*, L.), the Canadian violet (*Viola Canadensis*, L.), the blood root (*Sanguinaria Canadensis*, L.), the dwarf cornel (*Cornus Canadensis*, L.), and many others, will remain monuments to the zealous work of those early botanists, and memorials of our country, as long as botanical science exists.

Boucher, who was governor of Three Rivers, and who published a work entitled "*Histoire Naturelle de la Nouvelle France, vulgairement dite le Canada,*" preceded Sarrasin by a few years. Beyond the work mentioned, he has left us nothing of importance.

Following Dr. Sarrasin, and replacing him as Royal Physician, was Dr. Gaultier, who was living at Quebec at the time of Kalm's visit. The two appear to have established an intimate friendship, and though Gaultier left no writings, he seemed to have been an enthusiastic botanist. His memory is perpetuated in our common little winter-green, which Kalm dedicated to his friend under the generic name of *Gaultheria*.¹

¹ There appears to be some confusion among botanists respecting the true orthography of this name. Kalm continually speaks of Dr. Gauthier as "Gauthier," and to him we doubtless owe the mistake since perpetuated. Dr. Gray says, "This is written in the Quebec Records as Gaultier. This genus should not be written *Gaultheria*, . . . nor *Gaultheria*, *Gautiera*, etc. If changed at all, the right orthography would be *Gaultiera*." (*Flora of North America*, I. i. 29.) This statement appears to have been based upon information derived at first hand from the late Abbé Brunet; yet we find the latter saying that "Some botanists have ventured to change the name of this plant to *Gautiera*, but the true orthography of the name of its discoverer is Gauthier, as appears from the

On October 16th, 1747, Prof. Peter Kalm, of Abo, Sweden, and a former pupil of Linnaeus, accompanied by one of his gardeners as assistant, set sail for North America. This event occurred ten years after Linnaeus announced his system of classification; and we may, therefore, consider the period in which Kalm undertook his journey, as one of great activity and interest in botanical research. The proposition of Kalm to undertake the task, was not based upon purely scientific grounds, however, for, as Linnaeus himself said, in justification of the undertaking, "A journey through North America would be yet of a more extensive utility than that through the northern parts of Siberia and Iceland, for the plants of America were then but little known and scientifically described, and by several trials it seemed probable that the greatest part of the North American plants would bear well the Swedish winters; and, what was more important, a great many American plants promised to be useful in husbandry and physic." Indeed, Kalm himself felt indifferent to the adverse public criticisms freely bestowed upon him, in view of the great public utility likely to result, and this he regarded as "the true reward of his pains and expenses." He was aided very materially by Dr. Linnaeus, to whose efforts in his behalf, he probably owed the final success of his mission, at least, in a very large degree.

Kalm reached Philadelphia on September 26th, 1748, and after spending sometime in the States—during which he discovered the laurel which Linnaeus dedicated to him under the generic name of *Kalmia*¹—he proceeded by way of Albany and Lake Champlain to Canada, making a somewhat prolonged stay at Quebec, where he met Dr. Gaultier,² with whom he formed an intimate friendship. It was at this time that he dedicated the genus *Gaultheria* to his friend, who discovered our pretty little winter-green.

After an absence of three years and eight months, Kalm returned to his old position at Abo, and there, in a small garden of his own, he cultivated hundreds of American plants, since he wished "to see what plants would bear the climate and bear good and ripe seeds so far north." As yet, the university had no botanic garden, and in all probability Kalm's efforts were the means of establishing the earliest institution of the kind in northern Europe.

Kalm's observations were embodied in a number of communications transmitted to the Swedish Academy. In the journal of his travels, only general observations of scien-

registers of Notre Dame de Quebec (Register, Aug. 26th, 1751). It would, besides, be undesirable to change a name consecrated like this by long use." (Can. Nat. N. Ser., i. 332). These variations, however, as well as Kalm's original mistake, are not strange, in view of the fact which Tanguay (Dict. Gen. i. 257) points out, that the name is variously spelled, *Gauthier*, *Gautier* and *Gaultier*. A fourth form of the name is *Gaultier*, as already pointed out, and as also occurs in Kalm's Travels, p. 604-5.

Mr. St. Cyr of Quebec confirms the Abbé Brunet's determination of the correct form of the name as *Gaultier*; therefore the *Gauthier* as it appears in the *Canadian Naturalist*, would appear to be an error introduced in making the translation. The same gentleman has also kindly supplied the following notes of interest:—"M. Gauthier, médecin du Roi, et Académicien qui fit en Canada des observations botaniques, météorologiques et médicales de 1742 à 1743." (Ceci est une erreur, car M. Gauthier était à Quebec dans l'automne 1749). "Il découvrit le thé du Canada et démonstra à l'Académie des Sciences, la supériorité de notre capillaire sur le capillaire français, etc. Il parla en même temps de notre thé qu'il désigna comme un breuvage excellent, etc., etc. L'Académie fut si satisfaite du Mémoire, qu'elle voulut, que cette plante portât le nom de M. Gauthier, et qu'elle fût appelée *Gaultheria*." Bibaud, Dictionnaire Historique, 129.

"Dans un rapport de l'intendant Bigot, au ministre français (dated Quebec, Oct. 15th, 1749), il est dit que 'le Sr. Kalm, ne s'est occupé, suivant le compte qui nous en a été rendu par le Sieur Gautier, médecin, qu'il a toujours accompagné, etc., etc.' Documents relatifs à la Nouvelle France, iii. 462."

¹ Travels in North America, i. 336.

² *Ibid.*, iii. 130.

tific interest are recorded, but from them we gather the following, as bearing upon the local flora.

The red mulberry (*Morus rubra*, L.) is referred to as growing in the vicinity of Montreal in 1749, where it had, probably, been introduced to cultivation.¹ He also remarks upon the trade in ginseng, which, at that time, had reached most encouraging proportions, though only a few years later this thriving commerce came to a sudden end, through the too eager haste of the people to realise all they could. The inferiority of the native oaks, as compared with the English timber, is commented upon.

Kalm appears to have been much impressed with the striking resemblance of many of our plants to those of the North European flora, since he remarks that, "about the Lower St. Lawrence, the plants bear a striking similarity to those of Sweden, while many water plants in Lake St. Peter are identical."² Plums, red currants, and other fruits, introduced to Quebec from Europe, are spoken of as doing well, but the French grapes, cultivated at Montreal, did not succeed. Melons are referred to as cultivated before the advent of Europeans, but this appears to be an error, borrowed from some of the earlier missionaries. We find also that the same mistake is repeated by Jefferys, who gives a brief account of the trees and plants of Canada, apparently borrowed from Charlevoix.³

The fruit of Kalm's efforts was secured to him, in very large measure, only indirectly. His extensive collections went to Linnæus, of whose herbarium they formed a part, yet distinguished from the collections of others by the initial K, prefixed to the name of each specimen.

The labors of Kalm gave so decided an impulse to Canadian botany; his collections formed so conspicuous a part of the material upon which Linnæus based his descriptions of American plants; and as moreover, he was essentially the first botanist in the field, he may justly be regarded as the father of Canadian botany. Nor could it have had a more respectable origin than at the hands of the celebrated disciple of the great Linnæus.

Following Kalm, after an interval of thirty-eight years, there appeared another bright light in the development of Canadian botany. In the year 1785-86, André Michaux visited America on a mission similar to that of Kalm. He was a native of France, and had studied under the celebrated botanist Bernard de Jussieu, from whom he gained a prestige scarcely inferior to that enjoyed by Kalm. In further prosecuting preparations for his contemplated journey, he visited England, Spain and Persia, whence he returned to France with very large collections of plants and seeds.⁴ From the French Government he received a commission to visit the continent of America, and collect trees and seeds for shipment to France; also to send such shrubs and plants as might serve to ornament the King's gardens. It will thus be seen that the primary object of his mission was similar to that which resulted in Kalm's voyage; but Michaux appears to have attached a much wider importance to his prospective work, and to have regarded it more from a scientific point of view, since he had already conceived the idea that the distribution of the trees of America should be studied, and that it would be possible to ascertain their original centres of dis-

¹ Travels in North America, iii. 64.

² *Ibid.*, iii. 210.

³ History of the French Dominion. Thos. Jefferys, London, 1760.

⁴ Voyage d'André Michaux en Canada, depuis le lac Champlain jusqu'à la Baie d'Hudson, par l'Abbé Brunet. Journey of Michaux to Canada, Can. Nat. N. Ser., i. 325. Journey to the high Mountains of Carolina in 1788. Am. Jour. Sc., xxxii. 466. Flora Boreali-Americana, Paris, 1803.

tribution through careful observation of their dimensions and predominance in different parts of the country. It was the elaboration of this idea that largely led him in so many directions, and over so wide a range of territory.

In pursuance of his object, Michaux, accompanied by a gardener as assistant, reached New York on October 1st, 1785. With this city as his head quarters, the first seven years of his work were directed to an exploration of the southern states as far as Florida, and during that time he gathered a rich harvest of material. In 1792, he carried into execution his plans for a visit to Canada. Proceeding by way of Saratoga and Lake Champlain, he reached Montreal on June 30th, and Quebec on July 16th. From this latter place as a rendezvous, he at once prepared for his projected journey into the interior. Visiting Montmorency, Lorette and Tadousac, he proceeded by way of the Saguenay to Lakes St. John and Mistassini, and thence towards Hudson Bay, through an unbroken wilderness. The unwillingness of his guides, however, to face the dangers and hardships of the winter then close at hand, compelled him to turn back after reaching the Rupert River. It was to this journey that we owe our knowledge of the pretty little primrose which Michaux named in memory of Lake Mistassini, *Primula Mistassinica*.

Among the most important results of this expedition, was a determination of the northern limits of distribution of many of our well known forest trees. Michaux's diary is also replete with notes concerning the climate and the vegetable products of all the districts visited by him. Returning as he went, he took his final departure from Canada on the approach of winter, reaching Philadelphia on December 8th. Though only five months in Canada, his mission was most fruitful of results to Canadian botany, and to him we owe, not only the earliest determinations relative to northern limits of distribution, but also the names of a very large number of our forest trees, as well as many of our smaller plants.

Michaux is known less by his writings than by his collections, yet he has left one or two works which remain monuments to his zealous industry. His "History of the North American Oaks" was published in 1801, the last publication before his death, which occurred in the following year. His notes and collections, however, served as the basis of his "Flora Boreali-Americana," which was published by the eminent botanist, Claude Louis Richard, in 1803,—a work containing descriptions of 1,700 plants with illustrations. More plants of our flora owe their names to him than to any other botanist of the period, except Linnaeus.

In his "Flora Boreali-Americana"¹ Hooker, speaking of botanical work previously accomplished in North America, says:—"These labours had been performed mainly by British naturalists, from the days of Newenham and Menzies, to those of Beechy and the officers attached to the Hudson's Bay Company's factories." The reference here made to Newenham, is not easy to understand, although there must have been good reasons for the introduction of the name of one who was apparently contemporary with Menzies. A thorough search has nevertheless failed to discover any trace of such a botanist; while by advice from the Royal Gardens at Kew, we are informed that they are equally at loss to understand the reference. Similar application to the Botanic Gardens of Harvard University has also resulted in obtaining no trace of him. The only conclusion which

¹ Preface, iv.

appears justifiable is, that Newenham may have been an enthusiastic collector, known to Hooker, but to very few others; and that, having published nothing, the remembrance of him has gradually passed away, until at this date, his identity is wholly lost.

The last botanist to claim our attention before the close of the eighteenth century, is Dr. Archibald Menzies, a surgeon in the Royal Navy, who was attached as naturalist to Vancouver's expedition, and accompanied him to the north-west coast of America. Menzies appears to have left no published works on the Canadian flora, but his extensive collections greatly extended our knowledge of the botany of the country. As a naturalist, he was essentially the first Englishman to enter the field of botanical exploration in Canada, after the conquest. His work has been commemorated by several botanists, in both genera and species, of which the genus *Menziesia* of Smith, and the *Abies Menziesii* of Lindley, are fitting examples. We thus have in the labors of this naturalist, occurring as they did in the last decade of 1700, a fitting conclusion of the history of Canadian botany in the eighteenth century.

I.—THEVET, ANDRÉ.

(1.) *Les Singularités de la France antarctique, autrement nommée Amérique et de plusieurs autres terres et isles découvertes de notre temps*: Paris, 1558. Also, published in English as

(2.) *The New Founde Worlde, or Antareticke, wherein is contained wonderfull and strange things, as well of humaine creatures, as beastes, fishes, foules and serpents, trees, plants, mines of golde and silver; garnished with many learned authorities, travailed and written in the French tong by that excellent learned man, Master Andrewe Thevet; and, now newly translated into English, wherein is reformed the errours of Ancient Cosmographers*: London, 1568.

Pritzel's *Thes. Bot. Lit.*, 469. Faribault's *Cat. d'Ouvrages sur l'Hist. de l'Amérique*: Quebec, 1837. Larousse's *Dict. Univers. du XIXe Siècle*.

II.—CHAMPLAIN, SAMUEL DE.—A native of France. Governor of Canada, and the founder of Quebec. Born at Brouage, in 1567; died at Quebec, Dec. 25th, 1635.

(3.) *Les Voyages du Sieur de Champlain*: Paris, 1615.

(4.) *Voyages de la Nouvelle-France Occidentale, dite Canada*: Paris, 1632.

(5.) *Œuvres de Champlain*: Quebec, 1870.

Appleton's *Cyc. of Biog.* Tanguay's *Dict. Gen.*, I. 113. Cassell's *Biog. Dict.*, 467. Bibaud's *Panth. Can.*, 59. Bibaud's *Dict. Hist.*, 78.

III.—DENIS, NICOLAS.—Governor of Acadia from 1632.

(6.) *Description Géographique et Historique des Côtes de l'Amérique Septentrionale, avec l'Histoire Naturelle de ce Pays*: Paris, 1672.

Faribault's *Cat. d'Ouvrages sur l'Hist. de l'Amérique*. Larousse's *Dict. Univers. du XIXe Siècle*.

IV.—CORNUT, JACQUES PHILIPPE.—Born at Paris, Oct. 18th, 1600; died at the same place, Aug. 23rd 1651. Commemorated by Linnæus in the genus *Cornutia*.

(7.) *Canadensium Plantarum Historia, etc.*: Paris, 1635.

Pritzel's *Thes. Bot. Lit.*, 69. Appleton's *Cyc. of Biog.*

V.—BOUCHER, PIERRE.—Governor of Trois Rivières, Canada. Died at Rivière-Ouelle, May 3rd, 1707.

(8.) Histoire Naturelle de la Nouvelle France, vulgairement dite le Canada: Paris, 1665.

Pritzel's Thes. Bot. Lit., 469. Appleton's Cyc. of Biog. Tanguay's Dict. Gen. Bibaud's Panth. Can., 38. Bibaud's Dict. Hist., 50.

VI.—TOURNEFORT, JOSEPH PITTON DE.—A native of France. Born at Aix, June 5th, 1636; died at Paris, Dec. 28th, 1708.

He described various collections of Canadian plants, made by Diéreville, Sarrasin, and others.

Pritzel's Thes. Bot. Lit., 320. Appleton's Cyc. of Biog., 953.

VII.—HENNEPIN, LOUIS.—A Franciscan Monk, who accompanied La Salle in his voyage down the Mississippi. Born in 1640; died in 1701.

(9.) A New Discovery of a Vast Country in America, extending about 4,000 miles, between New France and Mexico; with descriptions of the great Lakes, Cataracts, Rivers, Plants and Animals, etc.: London, 1698.

Appleton's Cyc. of Biog. Faribault's Cat. d'Ouv. sur l'Hist. de l'Amérique.

VIII.—DIÉREVILLE, N.—A French traveller, who made a voyage to America, in 1699.

On his return to France, he carried with him a number of plants, among which was the bush honeysuckle, which Tournefort named in his honor, thus establishing the genus *Diervilla*.

(10.) Voyage du Port-Royal de l'Acadie ou Nouvelle France: Amsterdam, 1708.

Pritzel's Thes. Bot. Lit., 82. Gray's Flora of N. A., I. 2. 18. Appleton's Cyc. of Biog. Larousse's Dict. Univ. du XIXe Siècle.

IX.—SARRASIN, MICHEL.—Born in 1659; died at Quebec, Sept. 9th, 1734. Physician at the Court of Quebec in 1730.

Sarrasin left no special writings on Canadian botany, but among the plants he sent to Tournefort, was the pitcher-plant discovered by him; hence, in his honor, the genus *Sarracenia* was established.

Pritzel's Thes. Bot. Lit., 278. Provancher's Flor. Can., 29. Appleton's Cyc. of Biog. Tanguay's Dict. Gen., I. 539. Bibaud's Dict. Hist., 294. Bibaud's Panth. Can., 255.

X.—LAFITAU, JOSEPH FRANÇOIS.—A Jesuit Missionary, resident at Caughnawaga, but native of France. Born at Bordeaux in 1670; died 1740.

(11.) La Plante du Ginseng de Tartarie decouverte en Canada: Paris, 1718.

Pritzel's Thes. Bot. Lit., 173. Appleton's Cyc. of Biog. Cassell's Biog. Dict., 847. Bibaud's Dict. Hist., 175. Bibaud's Panth. Can., 143.

XI.—CHARLEVOIX, PIERRE FRANÇOIS-XAVIER DE.—A Jesuit Missionary, native of France, who travelled through Canada, down the Mississippi, and to St. Domingo. Born in 1683; died in 1761.

(12.) Voyage to North America: London, 1761.

(13.) Histoire de la Nouvelle France : Paris, 1744.

Appleton's Cyc. of Biog. Faribault's Cat. d'Ouv. sur l'Hist. de l'Amerique.
Bibaud's Dict. Hist., 79. Bibaud's Panth. Can., 61.

XII.—GAULTIER, HUGUES.—Resident physician at the Court of Quebec from 1742 to 1743. Gaultier was a naturalist, who does not appear to have published any special papers on the flora of the country. To him Kalm dedicated the genus *Gaultheria*.

Pritzel's Thes. Bot. Lit., 118. Provancher's Flor. Can., 365. Can. Nat., N. Ser., I. 332. Bibaud's Dict. Hist., 129. Bibaud's Panth. Can., 110. Tanguay's Dict. Gen., I. 257. Gray's Flora of N. A., I. 1. 29.

XIII.—DUHAMEL DU MONCEAU, HENRI-LOUIS.—A celebrated naturalist who was born at Paris in 1700, and died in 1782. He visited Canada in 1740, and made a series of botanico-meteorological observations during the years 1741-1744.

(14) Observations Botanico-Météorologique faites à Quebec en Canada, 1744-1745. Dans les Mémoires de l'Académie, Paris, 1746.

Appleton's Cyc. of Biog. Cassell's Biog. Dict., 572. Faribault's Cat. d'Ouv. sur l'Hist. de l'Amérique. Bibaud's Panth. Can., 89.

XIV.—LINNÆUS, CARL.—A native of Sweden and Prof. of Botany at Upsala. Born at Rashutt, May 23rd, 1707; died at Upsala, Jan 10th, 1778.

Linnaeus wrote nothing specially pertaining to the Canadian flora, but he described large numbers of plants collected by Kalm and others.

Pritzel's Thes. Bot. Lit., 190. Appleton's Cyc. of Biog., 499.

XV.—JEFFERYS, THOMAS.

(15.) History of the French Dominion, etc.: London, 1761.

Faribault's Cat. d'Ouv. sur l'Hist. de l'Amerique.

XVI.—KALM, PETER.—A native of Finland, pupil of Linnæus, and afterwards Professor at Abo. Born at Nerpis, in 1715; died at Abo, Nov. 16th, 1779. To him the genus *Kalmia*, discovered on his journey to America, was dedicated by Linnæus.

(16.) Travels in North America: London, 1770.

(17.) En Resa til Norra America: Stockholm, 1753-1761.

(18.) Beschreibung der Reise nach dem Nördlicher Amerika: Göttingen, 1754.

(19.) Norra Americanska färg-order: Abo, 1763.

Pritzel's Thes. Bot. Lit., 161. Appleton's Cyc. of Biog. Provancher's Flor. Can., 370. Bibaud's Dict. Hist., 165. Gray's Flora of N. A., I. 1. 37. Cassell's Biog. Dict., 827.

XVII.—FORSTER, JOHANN REINHOLD.—Born at Dirschau, Oct. 22nd, 1729; died at Halle, Dec. 9th, 1798. Professor of Natural History at the University of Halle from 1780.

(20.) Flora Americæ Septentrionalis; or a Catalogue of North American Plants: London, 1771.

Pritzel's Thes. Bot. Lit., 110. Appleton's Cyc. of Biog. Cassell's Biog. Dict., 645.

XVIII.—BARTRAM, WILLIAM.—The son of John Bartram, and native of Pennsylvania. Born at Philadelphia in 1739; died in Delaware, July 22nd, 1823.

(21.) Observations etc., in Travels from Pennsylvania to Onondaga, Oswego, and the Lake Ontario in Canada: London, 1751.

(22.) An Account of the Species, Hybrids, and other Varieties of the Vine of North America: New York Med. Repos., 1804, I. 19-24.

XIX.—HEARNE, SAMUEL.—A native of England. Born in 1745; died in 1792.

(23.) A Journey from Prince of Wales Fort in Hudson's Bay, to the Northern Ocean, 1769-1772: London, 1796.

Appleton's Cyc. of Biog. Cassell's Biog. Dict., 763. English Cyclopedia. Larousse's Dict. Univers. du XIXe. Siècle.

XX.—MICHAX, ANDRÉ.—A native of France. Born at Versailles March 7th, 1746; died at Madagascar, Nov. 13th, 1802. To him L'Heretier dedicated the genus *Michauxia*.

(24.) Histoire des chênes de l'Amérique septentrionale: Paris, 1801.

(25.) Geschichte der Amerikanischen Eichen: Stuttgart, 1802.

(26.) Flora Boreali-Americana: Paris, 1803.

Pritzel's Thes. Bot. Lit., 217. Appleton's Cyc. of Biog. Cassell's Biog. Dict., 927. Larousse's Dict. Univers.

XXI.—L'HERITIER, CHARLES LOUIS.—Born at Paris in 1746; died Aug. 16th, 1800. Commemorated by Aiton in the genus *Heritiera*.

He finds a place here on account of his having described various Canadian plants collected by Michaux and others.

Pritzel's Thes. Bot. Lit., 184.

XXII.—RICHARD, LOUIS CLAUDE MARIE.—An eminent French botanist. Born at Versailles, Sept. 4th, 1754; died at Paris, June 7th, 1821; the genus *Richardia* was established by Kunth in his honor.

(27.) Flora Boreali-Americana, sistens characteres plantarum, quas in America Septentrionali collegit et detexit Andreas Michaux: Paris, 1803.

Pritzel's Thes. Bot. Lit., 263. Appleton's Cyc. of Biog.

XXIII.—MENZIES, ARCHIBALD.—A native of England; Surgeon in the Royal Navy, and Naturalist to Vancouver's expedition. Born at Weem, Perthshire, March 15th, 1754; died at Kensington, Feb. 15th, 1842. Commemorated in the genus *Menziesia* of Smith, and in *Abies Menziesii*, of Lindley. He published no papers specially relating to the Canadian Flora.

Pritzel's Thes. Bot. Lit., 213. R. Soc. Cat. IV., 345. Gray's Flora of N.A., I. 1. 39.

XXIV.—WELD, ISAAC.

(28.) Travels through the States of North America and of the Provinces of Upper and Lower Canada, 1795-1797: London, 1800.

The following additional works may contain information of interest :—

DOBBS, ARTHUR.

An Account of the Countries adjoining Hudson's Bay : London, 1744.

ELLIS, HENRY.

Voyage for the Discovery of a North-West Passage by Hudson's Straits to the Western and Southern Ocean of America, in the years 1746 and 1747 : London, 1748.

KNOX, JOHN.

Historical Journal of the Campaigns in North America for the years 1757-58-59 and 1760 : London, 1769.

MULLER, SAMUEL.

Voyages from Asia to America, and Discovery of the North-West Coast of America : London, 1761.

PICHON, THOMAS.

Lettres et Mémoires pour servir à l'histoire naturelle, civile et politique du Cap-Breton, depuis son établissement jusqu'à la reprise de cette isle par les Anglais en 1758 : London, 1760.

ROBSON, JOSEPH

Account of Six Years' Residence in Hudson's Bay, from 1733 to 1736, and from 1744 to 1747 : London, 1752.

UMFREVILLE, EDWARD.

The Present State of Hudson's Bay ; containing a full description of that settlement and the adjacent country : London, 1790.

WHITBOURNE, RICHARD.

A Discourse and Discovery of Newfoundland : London, 1622.